REMARKS

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and the instant response has been prepared. Applicant would also like to thank the Examiner for taking the time to discuss the present application during a telephone interview on August 24, 2010. It is noted that applicant and Examiner were able to reach an agreement during the interview that the outstanding claim rejections are overcome for the below reasons. As such, reconsideration and allowance of the present application is requested.

Claims 1 – 3, 5, and 12 – 20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dohno (EP 1324403). The rejections are traversed for the following reasons.

Claim 1 calls for an external force control method for controlling an external force applied to a first living body portion of an animal through an orthosis attached to the first living body portion. Read as a whole, the method of claim 1 requires the consideration of both a measured myoelectric potential and a measured motion variable (which is defined as being a measurement of a resultant force of the internal and external forces). More particularly, the method of claim 1 sets a factor as a ratio of the external force (set using the measured myoelectric potential as a variable) to the measured motion variable (measured as a resultant force of the external force and an internal force), and determines whether the set factor deviates from a target factor by a sufficient amount (e.g., the reference value) to warrant the setting of a new external force function.

The Dohno publication discloses a controller 30 which controls a pair of electro-active actuators 50 and electrodes 60 carried on a flexible support 10. *Dohno, paragraph [0024].* Particularly, the controller 30 controls the actuators 50 to assist (or resist) motion of a user's joint based on signals received from a sensor 20. *Dohno, paragraph [0025].* The sensor 20 is disclosed as being disposed inside the support 10 to come into contact with the skin of the user around the subject joint for sensing the motion of the joint being made. *Id.* The sensor 20 is further disclosed as being a strain gauge, a myoelectric sensor, or a pressure sensor. *Id.*

In operation, the controller 30 gives a varying DC voltage across the

electrodes 60 to generate an assisting force AF which is proportional to and less than the actual human force HF by a constant amount. *Id.* The amount of assisting force AF to be provided by the support 10 is determined using a power table 32 which stores a plurality of programs respectively defining different relationships between the monitored amount of the human force HF and a target value for the assisting force AF. *Id.*

It is initially noted that the Dohno publication only discloses a single type of sensor being used with the support 10. Particularly, the Dohno publication discloses that the "sensor 20 may be a strain gauge, myoelectric sensor, **or** pressure sensor". *Id., (emphasis added).* The use of the term "or" indicates that only one of the listed sensors is used. It is also noted that the disclosure of the power table 32, as well as the plurality of programs stored therein, is only generally made, without any particular details regarding the "relationships" being disclosed. The only description regarding the "relationships" discloses an aim to maintain a constant difference between the human force HF and the assisting force AF. *Id.*

It is submitted that the Dohno publication does not teach or suggest an external force control method which includes a consideration of both a myoelectric potential and a motion variable, as is required by claim 1. As noted above, the Dohno publication only discloses the use of a single type of sensor in the support. Such a configuration would allow for measuring only one of a myoelectric potential *or* a value which corresponds to the motion variable of claim 1. Consequently, the Dohno patent does not disclose a method including steps of "measuring a myoelectric potential" *and* "measuring a motion variable". For this reason alone, the Dohno patent does not teach or suggest each and every feature of claim 1.

Further, even if the disclosure of the sensor in Dohno could be interpreted to allow for different types of sensors to be used in a single device, the Dohno publication only discloses setting an assisting force AF (e.g., an external force) to be less than a human force HF by a constant amount. The Dohno publication does not disclose setting a factor which is a ratio of the assisting force AF (the external force of claim 1) to the sum of the assisting force AF and the human force HF (the resultant force of the external and internal forces of claim 1), as is required by the "factor setting step" of claim 1. Rather, the Dohno publication only discloses using a

relationship which establishes a DC voltage to be provided to the actuators 60 such that the assisting force AF is less than the human force HF by a constant amount. Consequently, the Dohno publication does not disclose the "factor setting step" of claim 1. For this additional reason, the Dohno publication does not teach or suggest each and every feature of claim 1.

Inasmuch as the Dohno publication does not disclose the factor setting step of claim 1, the Dohno publication also does not disclose a comparison between a set factor and a target factor, nor does the Dohno publication disclose setting a new external force function if the difference between the set and target factors is equal to or greater than a reference value. Particularly, as Dohno does not disclose setting a factor (e.g., the ratio as defined by claim 1), Dohno has no reason to compare the factor to a target value, as is required by claim 1. As the comparison of the set value for the factor with the target value is recited by claim 1, the Dohno publication does not teach or suggest this feature.

With respect to the external force function setting step of claim 1, it is noted that a new external force function is set (when the set and target values for the factor sufficiently deviate from one another) "in such a way that the set value of the factor γ approaches the target value γ_t". The Dohno publication discloses that the assisting force AF is to remain a constant value less than the human force HF. As such, the method disclosed by the Dohno publication does not try to maintain any set ratio of assisting force to total force (e.g., AF/AF+HF), nor does the Dohno method alter the assisting force AF to maintain or approach any target ratio (e.g., the factor of claim 1). For example, with reference to the graph of Fig. 6 in the Dohno publication, assuming a constant difference between the human force HF and the assisting force AF is set at a value of 2 (units not used in graph), and the human force HF increases from a value of 5 to a value of 7, the ratio of assisting force AF to total force (AF + HF) changes, by design, from 3/8 (AF = 3, AF + HF = 8) to 5/12 (AF = 5, AF + HF = 12).

As such, the Dohno publication also does not disclose an external force function setting step that sets a new force function to allow a set value of the factor to approach a target value. Accordingly, the Dohno publication does not teach or suggest the "external force function setting step" of claim 1, and therefore does not

teach or suggest each and every feature of claim 1.

For all of the above reasons, it is submitted that the Dohno publication does not teach or suggest each and every feature of claim 1. Accordingly, the Dohno publication does not support a *prima facie* case of obviousness with respect to claim 1. As such, reconsideration and withdrawal of the rejection of claim 1 is requested.

Claims 2, 3, 5, 12, 15, and 16 depend from claim 1 and are therefore also considered allowable over the art. As such, withdrawal of the rejections of claims 3, 12, 15, and 16 is requested.

Claim 13 and 14 are independent claims which recite features similar to those of claim 1. As such, the arguments presented above in favor of the patentability of claim 1 are considered relevant to the patentability of claims 13 and 14, and are hereby incorporated in full by reference. In view of the incorporated arguments, it is submitted that the Dohno publication does not teach or suggest each and every feature of claims 13 and 14, and as such does not render these claims obvious. Accordingly, reconsideration and withdrawal of the rejections of claims 13 and 14 is requested.

Claims 17 and 18 depend from claim 13 and **claims 19 and 20** depend from claim 14. Based on their dependence from a base claim which has been shown to be allowable over the art, dependent claims 17 – 20 are also considered allowable over the art. As such, withdrawal of the rejections of claims 17 – 20 is requested.

Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dohno in view of Haslam, II et al. (U.S. Patent No. 5,413,611). The rejection is traversed for the following reasons.

Claim 4 depends from claim 1. Accordingly, to render claim 4 obvious, the combined references must teach or suggest all features of claim 1. In this regard, the shortcomings of Dohno with respect to claim 1 are discussed above. The Haslam patent, which is cited for teaching a force control method in which the external force is controlled in such a way that the maximum measured force approaches the maximum target, fails to remedy the shortcomings of Dohno.

As such, claim 4 includes features that are not taught or suggested by the cited art, and is therefore not rendered obvious thereby. Reconsideration and withdrawal of the rejection of claim 4 is requested.

Claims 7 and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dohno in view of Kawai et al. (US 2004/0107780). The rejections are traversed for the following reasons.

Claims 7 and 8 depend from claim 1. Accordingly, to render claims 7 and 8 obvious, the combined references must teach or suggest all features of claim 1. In this regard, the shortcomings of Dohno with respect to claim 1 are discussed above. The Kawai application, which is cited for teaching an external force control method in which primitive variables are measured and inputted to an inverse dynamics model along with motion state data in order to determine the motion state, fails to remedy the shortcomings of Dohno.

As such, claims 7 and 8 include features that are not taught or suggested by the cited art, and are therefore not rendered obvious thereby. Reconsideration and withdrawal of the rejections of claims 7 and 8 is requested.

Claims 9 – 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dohno in view of Davalli et al. (U.S. Patent No. 6,740,123). The rejections are traversed for the following reasons.

Claims 9 – 11 depend from claim 1. Accordingly, to render claims 9 – 11 obvious, the combined references must teach or suggest all features of claim 1. In this regard, the shortcomings of Dohno with respect to claim 1 are discussed above. The Davalli patent, which is cited for teaching four band factors each depending from the bend of the wrist and EMG activity feedback which results in different force controls, fails to remedy the shortcomings of Dohno.

As such, claims 9 – 11 include features that are not taught or suggested by the cited art, and are therefore not rendered obvious thereby. Reconsideration and withdrawal of the rejections of claims 9 – 11 is requested.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. SAT-16887.

Respectfully submitted,

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